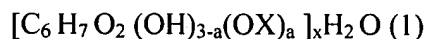


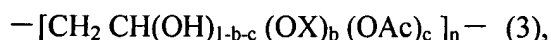
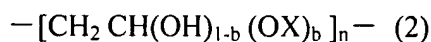
AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions of claims in the application.

1. (Currently Amended): A non-viral gene delivery vector formed from an aqueous solution of [[A]] a cationic graft-copolymer of a water-soluble linear backbone polymer having hydroxyl groups, for a non-viral gene delivery vector, comprising a unit derived from a cationic water-soluble linear polysaccharide of the following formula (1)



or a unit derived from a water-soluble linear polyvinylalcohol of the following formula (2) or a partial hydrolyzed alcohol of the following formula (3)



wherein ~~Wherein~~ X is a $-(CH_2)_m R_1$ organic radical where R_1 is a member of the class consisting of:

- $-NH_2$ radical,
- $-N(CH_3)_2$ radical,
- $-N(C_2H_5)_2$ radical,
- $-N^+(C_2H_5)_3$ radical,
- $-N^+(CH_2)_2CH_2CH(OH)CH_3$ radical,
- $-N^+(C_2H_5)_2CH_2CH(OH)CH_3$ radical,
- $-N^+(C_2H_5)_2(C_2H_5)N(C_2H_5)_2$ radical,
- $-C_6H_4NH_2$ radical, [[and]]
- $-COC_6H_4NH_2$ radical,

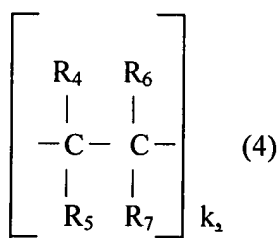
—COR₂ radical where R₂ is —CH₂NH₂ or —C₆H₄NH₂, and

—CH₂ CH(OH)CH₂R₃ radical [[,]] where R₃ is —NH₂, —N(CH₃)₂, —N(C₂H₅)₂,

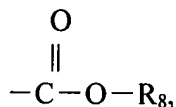
[[and]] or —N⁺(C₂H₅)₃ radical,

where m is a natural number of 1 to 3, a is a positive number having a value of 0<a<3, b is a positive number having a value of 0<b<1, x and n are natural numbers having a value of 5 or more, 1>b+c, and Ac is acetyl radical; and

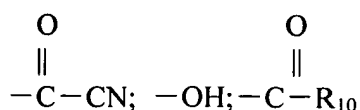
a unit derived from a polymerize-able olefin compound of the following formula (4):



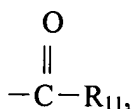
wherein ~~Wherein~~ R₄, R₅ and R₆ are each selected from the group consisting of hydrogen and CH₃, and R₇ is a member of the group consisting of:



~~Where~~ where R₈ is a member of the class consisting of: hydrogen, C₁ —C₁₂ alkyl radicals, cyclohexyl radical, C₁ —C₄ hydroxyalkyl radicals, C₁ —C₈ aminoalkyl radicals, C₁ —C₈ dialkylaminoalkyl radicals, glycidyl radical, tetrahydrofuran radical, C₁ —C₄ lower alkyl —substituted tetrahydrofuran radical, benzyl radical, [[the]] a (CH₂CH₂O)_y CH₂CH₂OH radical where y is a positive integer from 1 to 10, and —N(R₉)₂, where the two [[R₉,s]] R₉'s which may be the same or different, are either hydrogen or a C₁ —C₄ alkyl radical;

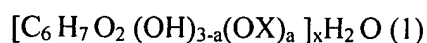


wherein ~~Wherein~~ R_{10} is a C_1-C_8 alkyl radical, $[[;]]$ phenyl radical, $[[;]]$ tolyl radical, $[[;]]$ pyridine radical, $[[;]]$ pyrrolidone radical; and

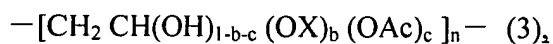
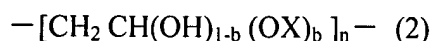


~~Where~~ where R_{11} is NH_2 , NHCH_3 , N,N-dimethylamino radical, $\text{N,N-dimethylaminopropylamino}$ radical, and morpholine radical.

2. (Currently Amended): A process for preparing a non-viral gene delivery vector formed from an aqueous solution of a cationic graft-copolymer of a water-soluble linear backbone polymer having hydroxyl groups, for a non-viral gene delivery vector, which comprises reacting a cationic water-soluble linear polysaccharide of the following formula (1)



or a unit derived from a water-soluble linear polyvinylalcohol of the following formula (2) or a partial hydrolyzed alcohol of the following formula (3)



wherein ~~Wherein~~ X is a $-(\text{CH}_2)_m\text{R}_1$ organic radical where R_1 is a member of the class consisting of:

$-\text{NH}_2$ radical,

$-\text{N}(\text{CH}_3)_2$ radical,

$-\text{N}(\text{C}_2\text{H}_5)_2$ radical,

$-\text{N}^+(\text{C}_2\text{H}_5)_3$ radical,

$-\text{N}^+(\text{CH}_2)_2\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$ radical,

$-\text{N}^+(\text{C}_2\text{H}_5)_2\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$ radical,

$-\text{N}^+(\text{C}_2\text{H}_5)_2(\text{C}_2\text{H}_5)\text{N}(\text{C}_2\text{H}_5)_2$ radical,

$-\text{C}_6\text{H}_4\text{NH}_2$ radical, [[and]]

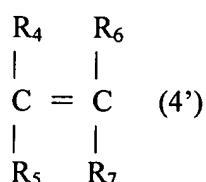
$-\text{COC}_6\text{H}_4\text{NH}_2$ radical,

$-\text{COR}_2$ radical where R_2 is $-\text{CH}_2\text{NH}_2$ or $-\text{C}_6\text{H}_4\text{NH}_2$, and

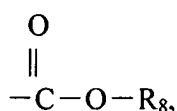
$-\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{R}_3$ radical where R_3 is $-\text{NH}_2$, $-\text{N}(\text{CH}_3)_2$, $-\text{N}(\text{C}_2\text{H}_5)_2$, [[and]]

or $-\text{N}^+(\text{C}_2\text{H}_5)_3$ radical,

where m is a natural number of 1 to 3, a is a positive number having a value of $0 < a < 3$, b is a positive number having a value of $0 < b < 1$, x and n are natural numbers having a value of 5 or more, $1 > b + c$, and Ac is acetyl radical; with a polymerize-able olefin compound of the formula (4'):

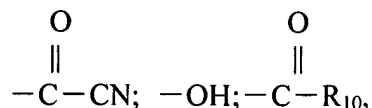


wherein ~~Wherein~~ R_4 , R_5 and R_6 are each selected from the group consisting of hydrogen and CH_3 , and R_7 is a member of the group consisting of:

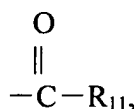


where ~~Where~~ R_8 is a member of the class consisting of hydrogen, $\text{C}_1 - \text{C}_{12}$ alkyl radicals, cyclohexyl radical, $\text{C}_1 - \text{C}_4$ hydroxyalkyl radicals, $\text{C}_1 - \text{C}_8$ aminoalkyl radicals, $\text{C}_1 - \text{C}_8$

dialkylaminoalkyl radicals, glycidyl radical, tetrahydrofuran radical, C₁–C₄ lower alkyl–substituted tetrahydrofuran radical, benzyl radical, ~~[[the]]~~ a (CH₂CH₂ O)_y CH₂CH₂OH radical where y is a positive integer from 1 to 10, and –N(R₉)₂ where the two ~~[[R₉,s]]~~ R₉'s which may be the same or different, are either hydrogen or a C₁–C₄ alkyl radical;

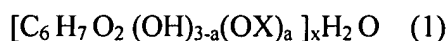


~~where~~ Where R₁₀ is a C₁–C₈ alkyl radical, ~~[[;]]~~ phenyl radical, ~~[[;]]~~ tolyl radical, ~~[[;]]~~ pyridine radical, ~~[[;]]~~ pyrrolidone radical; and

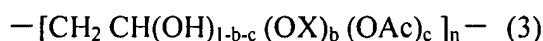
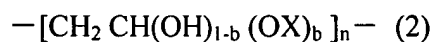


~~where~~ Where R₁₁ is NH₂, NHCH₃, N,N-dimethylamino radical, N,N-dimethylaminopropylamino radical, and morpholine radical.

3. (Currently Amended): A complex between a cationic graft-copolymer of a water-soluble linear backbone polymer having hydroxyl groups and DNA, comprising a unit derived from a cationic water-soluble linear polysaccharide of the following formula (1)



or a unit derived from a water-soluble linear polyvinylalcohol of the following formula (2) or a partial hydrolyzed alcohol of the following formula (3)

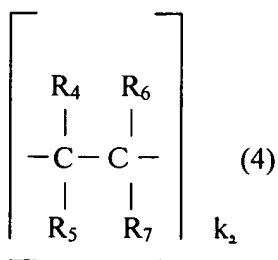


wherein ~~Wherein~~ X is a $-(CH_2)_m R_1$ organic radical where R_1 is a member of the class consisting of:

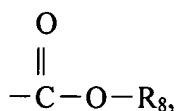
$-NH_3^+$ radical,
 $-NH^+ (CH_3)_2$ radical,
 $-NH^+ (C_2H_5)_2$ radical,
 $-N^+ (C_2H_5)_3$ radical,
 $-N^+(CH_2)_2CH_2CH(OH)CH_3$ radical,
 $-N^+(C_2H_5)_2CH_2CH(OH)CH_3$ radical,
 $-N^+(C_2H_5)_2(C_2H_5)N (C_2H_5)_2$ radical,
 $-C_6H_4NH_3^+$ radical, [[and]]
 $-COC_6H_4NH_3^+$ radical,
 $-COR_2$ radical where R_2 is $-CH_2NH_3^+$ or $-C_6H_4NH_3^+$, and
 $-CH_2CH(OH)CH_2R_3$ radical where R_3 is $-NH_3^+$, $-NH^+ (CH_3)_2$, $-NH^+ (C_2H_5)_2$,
[[and]] or $-N^+ (C_2H_5)_3$ radical,

where m is a natural number of 1 to 3, a is a positive number having a value of $0 < a < 3$,
b is a positive number having a value of $0 < b < 1$, x and n are natural numbers having a value
of 5 or more, $1 > b + c$, and Ac is acetyl radical;

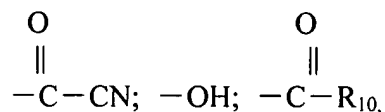
a unit derived from a polymerize-able olefin compound of the following formula (4)



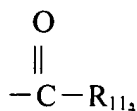
wherein ~~Wherein~~ R_4 , R_5 and R_6 are each selected from the group consisting of hydrogen and CH_3 and R_7 is a member of the group consisting of:



where ~~Where~~ R_8 is a member of the class consisting of hydrogen, $C_1 - C_{12}$ alkyl radicals, cyclohexyl radical, $C_1 - C_4$ hydroxyalkyl radicals, $C_1 - C_8$ aminoalkyl radicals, $C_1 - C_8$ dialkylaminoalkyl radicals, glycidyl radical, tetrahydrofuran radical, $C_1 - C_4$ lower alkyl -substituted tetrahydrofuran radical, benzyl radical, ~~[[the]]~~ a $(CH_2CH_2 O)_y CH_2CH_2OH$ radical where y is a positive integer from 1 to 10, and $-N(R_9)_2$ where the two ~~[[R_9 ,s]]~~ R_9 's which may be the same or different, are either hydrogen or a $C_1 - C_4$ alkyl radical;

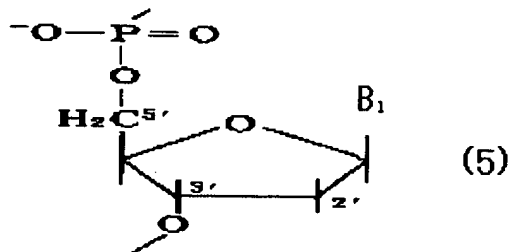


where ~~Where~~ R_{10} is a $C_1 - C_8$ alkyl radical, ~~[[;]]~~ phenyl radical, ~~[[;]]~~ tolyl radical, ~~[[;]]~~ pyridine radical, ~~[[;]]~~ pyrrolidone radical; and



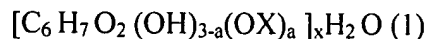
where ~~Where~~ R_{11} is NH_2 , $NHCH_3$, N,N -dimethylamino radical, N,N -dimethylaminopropylamino radical, and morpholine radical; and

a unit derived from a poly(deoxyribonucleotide) of the following formula (5) as a recurring unit[$\left[\cdot \right]$]:

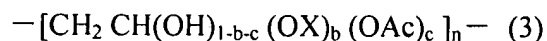
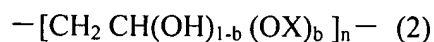


where ~~Where~~ B₁ is a base selected from the group of adenine, thymine, guanine, and cytosine.

4. (Currently Amended): A complex between a cationic graft-copolymer of a water-soluble linear backbone polymer having hydroxyl groups and RNA, comprising a unit derived from a cationic water-soluble linear polysaccharide of the following formula (1)



or a unit derived from a water-soluble linear polyvinylalcohol of the following formula (2) or a partial hydrolyzed alcohol of the following formula (3)



wherein ~~Wherein~~ X is a $-(CH_2)_mR_1$ organic radical where R₁ is a member of the class consisting of:

- NH₃⁺ radical,
- NH⁺(CH₃)₂ radical,
- NH⁺(C₂H₅)₂ radical,
- N⁺(C₂H₅)₃ radical,

$-\text{N}^+(\text{CH}_2)_2\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$ radical,

$-\text{N}^+(\text{C}_2\text{H}_5)_2\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$ radical,

$-\text{N}^+(\text{C}_2\text{H}_5)_2(\text{C}_2\text{H}_5)\text{N}(\text{C}_2\text{H}_5)_2$ radical,

$-\text{C}_6\text{H}_4\text{NH}_3^+$ radical, [[and]]

$-\text{COC}_6\text{H}_4\text{NH}_3^+$ radical,

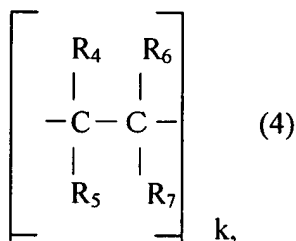
$-\text{COR}_2$ radical where R_2 is $-\text{CH}_2\text{NH}_3^+$ or $-\text{C}_6\text{H}_4\text{NH}_3^+$, and

$-\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{R}_3$ radical where R_3 is $-\text{NH}_3^+$, $-\text{NH}^+(\text{CH}_3)_2$, $-\text{NH}^+(\text{C}_2\text{H}_5)_2$,

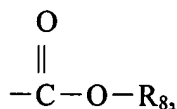
[[and]] or $-\text{N}^+(\text{C}_2\text{H}_5)_3$ radical,

where m is a natural number of 1 to 3, a is a positive number having a value of $0 < a < 3$,
 b is a positive number having a value of $0 < b < 1$, x and n are natural numbers having a value
 of 5 or more, $1 > b + c$, and Ac is acetyl radical;

a unit derived from a polymerize-able olefin compound of the following formula (4)

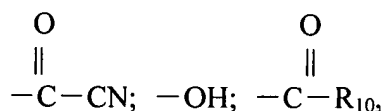


wherein ~~wherein~~ R_4 , R_5 and R_6 are each selected from the group consisting of hydrogen and
 CH_3 and R_7 is a member of the group consisting of:

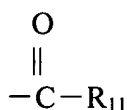


where ~~where~~ R_8 is a member of the class consisting of hydrogen, $\text{C}_1 - \text{C}_{12}$ alkyl radicals,
 cyclohexyl radical, $\text{C}_1 - \text{C}_4$ hydroxyalkyl radicals, $\text{C}_1 - \text{C}_8$ aminoalkyl radicals, $\text{C}_1 - \text{C}_8$

dialkylaminoalkyl radicals, glycidyl radical, tetrahydrofuran radical, C₁-C₄ lower alkyl-substituted tetrahydrofuran radical, benzyl radical, $[(CH_2CH_2O)_yCH_2CH_2OH]$ radical where y is a positive integer from 1 to 10, and $-N(R_9)_2$ where the two R_9 's which may be the same or different, are either hydrogen or a C₁-C₄ alkyl radical;

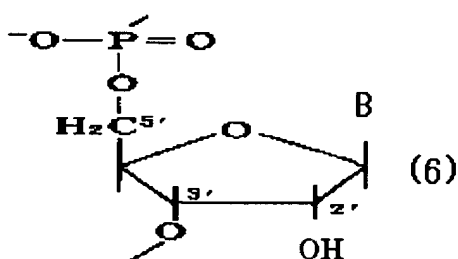


where ~~Where~~ R₁₀ is a C₁-C₈ alkyl radical, $[(phenyl)]$ phenyl radical, $[(tolyl)]$ tolyl radical, $[(pyridine)]$ pyridine radical, $[(pyrrolidone)]$ pyrrolidone radical; and



where ~~Where~~ R₁₁ is NH₂, NHCH₃, N,N-dimethylamino radical, N,N-dimethylaminopropylamino radical, and morpholine radical; and

a unit derived from a poly(ribonucleotide) of the following formula (6) as a recurring unit $[(.)]$:



where ~~Where~~ B is a base selected from the group of adenine, uracil, guanine, and cytosine.

5. (Currently Amended): A gene delivery system using $[(a)]$ the complex between the cationic graft-copolymer and DNA $[(,)]$ of Claim 3.

· Amendment Under 37 C.F.R. §1.111
· Application No. 10/536,901
· Attorney Docket No. 052603

6. (Currently Amended): A gene delivery system using [[a]] the complex between the cationic graft-copolymer and RNA [[,]] of Claim 4.